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| 09/206,216 | 12/05/1998 | JEAN-PIERRE DATH | F-721 | 5195 |

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1764

DATE MAILED: 07/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 20040723

Application Number: 09/206,216
Filing Date: December 05, 1998
Appellant(s): DATH ET AL.

MAILED
JUL 30 2004
GROUP 1700

William D. Jackson
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 07, 2004.

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(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The amendment after final rejection filed on May 7, 2004 has been entered.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 17 & 40, 20, 41 & 42, and 43 & 44 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

EP 0109060

Colombo et al.

5-1994

4078011

Glocker et al.

7-1978

4347392

Cosyns et al.

08-1982

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Double Patenting

Claims 17-20 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-16 of copending Application No. 09/206,218. Although the conflicting claims are not identical, they are not patentably distinct from each other because both process claims disclose the catalytic cracking of an olefin to produce propylene by using a dealuminated catalyst. The present claimed process does not disclose that the catalyst is prepared as claimed in claims 1-16 of application 09/206,218. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the claimed process of the present application as claimed in the copending application because the present claimed catalyst is the same as the claimed catalyst of the copending application. Therefore, it would be expected that the outcome of the present claimed process would be the same or similar when preparing the catalyst as claimed in the claimed process of the copending application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

Claims 17-20 and 38-44 are rejected under 35 U.S.C. 103(b) as being unpatentable over EP 0109060 in view of either Glockner et al. (4,078,011) or Cosyns et al. (4,347,392).

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The EP 0109060 reference discloses a process of cracking a hydrocarbon feed which comprises olefins having 4 to 12 carbon atoms into propylene and some ethylene. The feed is contacted with an alumino-silicate having a crystalline and zeolitic structure. The process is conducted at a temperature of from 400⁰ C to 600⁰ C, at about atmospheric pressure, and at a space velocity of from 5 to 200 h⁻¹. The behavior of the silicalites depends on the conversion pressure. If the pressure is atmospheric, the space velocity must be lower than 50 hr⁻¹. If the pressure is from 1.5 to 7.5 atmospheres, the space velocity must be above 50 hr⁻¹. The examples indicate selectivity of C₄ saturated compounds of less than 5 wt. %. Therefore, at least 95% of the C₂ and C₃ compounds present in the product must be olefins. The data in the table also indicates that propylene yield is within the claimed range and indicate that olefin contents of the feed and product are within %15 % or %10 % of each other. Alternatively, it is inherent that the EP reference would have olefins of the feedstock and of the effluent that are within plus and minus 15% of each other because of the similarities by the EP process and the claimed process in terms of feedstock, catalyst, and operating conditions. It is noted that the reference does not specifically disclose a ratio of silicon/aluminum between 180 and 1000 or between 350 and 500. However, the reference discloses that the catalyst has a SiO₂/Al₂O₃ molar ratio equal to or greater than 350. This is equivalent to silicon/aluminum atomic ratios of equal to or greater than 175. Therefore, the examiner's position is that the claimed ratio of silicon/aluminum is embraced by the reference. (See page 1, lines 20-35; page 3, lines 18-40; page 5, lines 13-19; pages 6-7; claims 1-3)

Regarding claims 20 and 17, the EP reference does not specifically disclose that the atomic ratio of silicon to aluminum is from 180-1000. However, it would have been obvious to

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one having ordinary skill in the art at the time the invention was made to have modified the EP catalyst by using a catalyst having an atomic ratio of silicon to aluminum of 180-1000 because the EP reference discloses that a catalyst having an atomic ratio of silicon to aluminum greater than 175 can be used in the process.

Regarding claims 17-20 and 38-44, the EP 0109060 reference does not specifically disclose that the feed contains dienes, and does not disclose the step of hydrogenation of dienes.

Glockner discloses a process for selectively hydrogenating dienes at a temperature of from 150 to 500° F (65 to 260° C), at a pressure of from 1 to 1000 atm (1-1000 bar), and at LHSV of from 2 to 10. Glockner also discloses that the olefinic feedstock comprises about 0.1-20 wt.% of diene and the conversion of diene is up to 99.5 %. It is estimated that when an olefinic feedstock comprises about 0.1 wt. % of dienes, the amount of diene remaining in the olefinic product would be about 0.0005 % [0.1 % (dienes in the feed) x 99.5 (% conversion)]. See col. 1, line 64-68; table II.

Cosyns discloses a process for hydrogenating dienes (diolefins) containing olefins. (See abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the EP 0109060 process by including a selective hydrogenation as disclosed by either Glockner or Cosyns because the EP process does not require the presence of dienes and one of ordinary skill in the art would look to the prior art processes such as disclosed by Glockner and Cosyns to remove dienes if such compounds are not desired.

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It is noted that both Glockner and Cosyns do not disclose the amount of dienes in the product. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Colombo /Glockner or Colombo/Cosyns because it is within the level of one of skill in the art to remove all dienes (e.g., equal or less than 0.03 wt. %) from the olefin mixture to produce a pure olefins by employing the process of either Glockner or Cosyns. The pure olefins from Glockner or Cosyns can be used in varied applications such as polymerization or catalytic cracking and it would be expected that the results would be the same or similar when using the pure olefin feedstock in the cracking process of Colombo because any olefinic feedstock can be used in the process.

Response to Arguments:

As an outside record, the Board is respectfully reminded that the present application is also related to copending application 09/205,559, now abandoned after decision by the Board. The difference between the copending application and the present invention is that the copending application does not claim a maximum amount of dienes in the feedstock.

The argument that Colombo does not address the subject of dienes in the feedstock and the Glockner or Cosyns process is not concerned with the hydrogenation of a feedstock to be applied to a cracking process is not persuasive because it appears that the feedstocks of Colombo do not contains dienes (see examples 1-6, 8-23). Even if the feedstock of Colombo comprises dienes, one of skill in the art would employ a well known hydrogenation process of either Glockner or Cosyns to remove dienes from the olefinic feedstock because it is well known that a

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large amount of dienes contained in an olefinic feedstock would depress the overall cracking conversion and/or selectivity of the process.

The argument that both of Glockner and Cosyns products would not be suitable in the process of Colombo is not persuasive. Removing dienes from either a paraffinic or olefinic feedstock (having carbon atoms of 3 or greater than 3) by hydrogenation is well known in the art. Both Glockner and Cosyns are relied upon to teach hydrogenating dienes in an olefinic feedstock. Given the teaching, one skilled in the art would employ the hydrogenation process to remove dienes. It is reminded that both Glockner and Cosyns do not need to suggest the intended use of the clean olefinic product. A clean olefinic stream can be employed in a hundred of applications such as polymerization, alkylation, cracking, or blending to name a few. (e.g., gasoline, lubricant)

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

The argument that the process of Glockner would produce a product comprising in excess of 0.1 wt.% of dienes is not persuasive. Glockner discloses that the amount of dienes in the feedstock is from 0.1 to 20 % and the conversion rate is up to 99.5%. It is estimated that when the feedstock comprises about 0.1% dienes and conversion is 99 %, the amount of dienes

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remaining in the feedstock would be within the claimed ranges. (See Glockner col. 1, lines 66-67; Table II). It is reminded that there is nothing novel about the claimed hydrogenation step.

The argument that, in example 25 of Colombo, the isobutene could well contain butadiene, so the olefin content of the feedstock and the effluent of Colombo would not be within ± 15 wt.% or ± 10 wt.% as set forth in claims 43 and 44 is not persuasive. In example 10, the selectivity of compounds other than olefins in the product is less than 10 wt. % ($0.46 + 0.68 + 3.59 + 4.95$) in the process of converting a feed containing pentene and helium under conversion of 42.81. Therefore, the olefins content of the feedstock and the effluent of Colombo must be within ± 10 wt.%. Referring to Table 4, example 25, the examiner calculates that for every 100 grams of isobutene reactant, 77.3 % by weight are converted thereby producing a product that contains 22.7 grams of isobutene and 77.3 grams of other compounds. The combined selectivity of C_2 and C_3 of 43.4% results in the product containing 33.5 grams of $C_2 + C_3$ (77.3×0.434). With a selectivity to saturated compounds less than C_4 of 6.6 %, the amount of $C_2 + C_3$ olefins is estimated to be 31.3 grams ($33.5 \text{ grams} \times 0.934$). Also, a selectivity to linear butenes of 44% results in the production of 34.0 grams ($77.3 \text{ grams} \times 0.44$) of linear butenes. Adding the amount of isobutene, C_2 olefins, C_3 olefins, and linear butenes results in product containing approximately 88 grams of C_2 to C_4 olefins. This amount results in a product that has an olefin content within ± 15 % or ± 10 % of the olefin content of the feed. (Please also see other examples).

There is no evidence that the Colombo isobutene contains butadiene. The isobutene can be produced by thousands of methods that do not necessarily produce an isobutene stream containing butadiene. Even if butadiene were present in isobutene, butadiene would be removed

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from the feedstock in the **modified process of Colombo/Glockner**. Anyhow, the limitations of claims 43 and 44 are disclosed in examples 10 or 25.

The argument that the Colombo reference fails to disclose the use of an MFI catalyst having a silicon/aluminum ratio of 180 to 1000 as required in applicant's claims and the claimed ratio shows unexpected results is not persuasive because Colombo discloses a $\text{SiO}_2/\text{Al}_2\text{O}_3$ mole ratio in the zeolite of equal to or greater than 350. This is equivalent to silicon/alumina atomic ratios of equal to or greater than 175. One of skill in the art would use any ratio which is greater than 175 including the claimed ratios. It would be expected that the results would be the same or similar when using a ratio of 176, 300, or 1001 in the process of Colombo. Since the Si/Al ratio of Colombo overlaps the claimed ratios, unexpected results would also be obtained in the process of Colombo. It is also to point out that the appellants disclose the performance of a process with a zeolitic catalyst having a Si/Al ratio of 50, 200, 300, and 490. The appellants do not disclose the performance of the process when the catalyst has a Si/Al ratio of 175, 500, 510, 540, 600, 700, or 1001. It is unclear if the results are different between using a catalyst having ratios of 175 and 180, between 176 and 900, or between 1000 and 10001. Therefore the unexpected results are not reliable.

The argument that Colombo does not disclose or suggest the particular combination of parameters (temperatures of from 500-600° C; LHSV of from 10-30 h⁻¹; pressure of from 0.1-2 bar) is not persuasive because Colombo discloses that the cracking process is operated at a temperature of from 400-600° C, at a LHSV of from 5-200 h⁻¹, and at a pressure of from 1.5 to 7.5 atmospheres. These conditions overlap the claimed parameters. Therefore, one of skill in the art would operate the process in the ranges of conditions as discussed above including the

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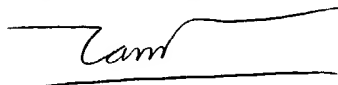
overlapped conditions. It is reminded that the invention of Colombo is not limited to **example**

36.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

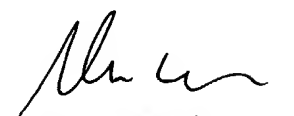
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